Childhood Lead Poisoning: Detection and Prevention

- Lead - #1 environmental hazard affecting children. Most vulnerable victims are those aged six and under.
Sources of Lead

Soil

Water

Lead-Based PAINT
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- Most common source of exposure for most American children.
- Approximately 25 percent of America’s homes contain lead-based paint.
Early 1990s Public Service Announcements: *Children eating paint CHIPS*. . . .

Those Americans who remember these kinds of images believe this is *the* source—the sole source—of lead poisoning. Because they see few homes with this level of deterioration, they believe the problem has been solved.
The History of Lead

In 2010, lead poisoning remains a health problem in the United States, most often because of its uses in paint and other substances. But why(?) was lead used so extensively; what was the attraction?

Lead’s Uses:

- Added to paint to promote durability, coatability, corrosion resistance, and color enhancement.
- Added to gasoline to boost octane and to prevent engine knocks.
- Added to plastics as a stabilizer.
- Added to some items as a flame retardant.

Lead’s utility—and its toxicity—were evidenced extensively as long ago as ancient Rome. For an excellent history, see: http://www.epa.gov/history/topics/perspect/lead.htm.
Lead-Based Paint DUST

**Intact** lead-based paint is rarely a problem, but aging paint typically deteriorates in areas that are exposed to moisture or friction, such as windows or doors. Lead dust is very often **invisible** but is the most common source of childhood lead poisoning.
Lead in Soil

Major Source: LEADED gasoline. Officially banned via the 1996 Clean Air Act. Those homes along widely-traveled highways may still be polluted.

Also: Paint chips or dust from deteriorated exterior lead-based paint find their way into the soil.
Lead in Water

Some aging homes still contain lead pipes, which can leach lead into the water. A far larger number of homes are plumbed with copper pipes joined with lead solder.

In homes with older plumbing, run water for two-three minutes until very cold (to flush pipes). Cook with cold water, rather than hot. Use bottled water for drinking and mixing baby formula.
Lead in Consumer Products:

- Imported Toys (particularly those sold in $ stores)
- Leaded crystal
- Imported ceramics/pottery
- Children’s imported jewelry
- Christmas lights and artificial trees (Lead is used for fire retardance.)
- (Some) Mexican candies (Lead is actually in the candy wrappers & leaches into candy.)

Recall Information:
www.cpsc.gov
Lead in Consumer Products: Importe Vinyl Mini Blinds

The use of lead in blinds is outlawed in the U.S., but inexpensive imported vinyl blinds often contain lead, used to stabilize the plastic.

The lead is very close to the surface and degrades easily.

Aluminum blinds are not affected.
Immigrant children often have elevated blood lead levels from exposure to foreign:

- Spices and seasonings
- Cosmetics
- Folk remedies
Introduction to the Body

Lead enters the body via both ingestion and inhalation.
Lead Absorption

- Children absorb 50 percent of ingested lead and retain at least 30 percent.

- Adults absorb 15 percent of ingested lead and retain less than five percent.

- Both children and adults absorb and retain as much as 70 percent of inhaled lead.

- Lead is stored in the kidneys, liver, bones (marrow), and brain.
Lead Effects in Children

May or may not exhibit any discernible signs of illness.

Possible symptoms include:
- Digestive complaints
- Headaches
- Hearing loss
- Anemia
- Sleep disorders

The most common—and disturbing—concern is neurological damage.
Ninety (90) percent of brain development is accomplished by age FIVE. Lead poisoning results in decreased IQ and, at very high levels, can cause mental retardation.
Socio-Behavioral Effects

- Aggression
- Irritability
- Hyperactivity
- Reduction in graduation rates and academic attainment
- Criminal and violent behavior
Children should be tested via finger or heel prick (capillary blood test) during routine physicals at 12 and 24 months of age. Currently, a confirmed blood lead level of 10 µg/dL is defined as childhood lead poisoning. Screening questions should be posed at every physical through age six.

Most experts in the field assert that the level should be reduced to 5µg/dL.
Interventions/Case Management:

- Continued monitoring of BLL
- Education/counseling
- Nutritional focus
- Environmental investigation
- Oral chelation therapy*

Reducing **fat** intake is important, as fat encourages the body’s absorption of lead.

Increasing **calcium** intake is important, as calcium **inhibits** the body’s absorption of lead.

*Chelation therapy reduces BLL but does not reverse any existing neurological damage.*
Lead Poisoning in ADULTS

In the U.S. today, adult blood poisoning is most often associated with occupational exposure. OSHA (Occupational Safety & Health Adm.) regulates testing procedures for industrial/occupational employees.

Some of those industries/professions that involve potential exposure to lead include:
- auto body & repair, ammunitions,
- battery manufacturing, bridge & ship building, construction & demolition,
- printing industry, ceramics, glass manufacturing, ceramics, and welding.

Those employees who are not vigilant in their cleanup efforts after leaving work may carry lead dust home to their families on their shoes or clothing—or in their vehicles.
Lead Toxicity in ADULTS

In October of 2009, the CDC dropped the official blood poisoning level for adults from 25 µg/dL to 10 µg/dL (the same # as for children).

The health concerns for blood poisoned adults:

- high blood pressure
- kidney damage
- fertility problems
- anemia
- gastrointestinal disorders
- memory and concentration difficulties.

Lead poisoning crosses the placental barrier, making it especially dangerous for pregnant women. It can cause miscarriage or result in brain damage to the baby.
The Future of Childhood Lead Poisoning Prevention . . .

- June 2009 - An Atlanta research team determines that “oral fluid testing” is a viable alternative to blood testing.

One of the barriers to testing children for lead is parents’ (and some physicians’) reluctance to perform even the capillary blood draw on small children. Perfecting this technology would be a huge step forward.

2009 Data: 130 confirmed cases of childhood lead poisoning in TN.
Questions? Resource Materials; Community Education:

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